

**ABSTRACT**

The invention relates to a device (1) which is used to produce hydrogen from a hydrocarbon, obtaining high energy efficiency and generating low levels of carbon dioxide and pollutants. The inventive device (1) comprises (a) a conversion reactor (4) which is used to convert the aforementioned hydrocarbons using water vapour. According to the invention, pure or almost pure oxygen is fed into the reactor (4) in order to oxidize one part of the hydrocarbons and to provide the heat necessary to convert virtually all of the other part of the hydrocarbons into hydrogen, carbon monoxide and carbon dioxide. The device (1) also comprises: (b) means (5) of pre-heating the hydrocarbons, the oxygen flow and the water to be vaporized; (c) at least one heat exchanger (6) which is used to cool the conversion products in order to recovery a fraction of the thermal energy of said conversion products; and (d) hydrogen-enrichment equipment. The above-mentioned reactor (4), the pre-heating means (5), the heat exchanger (6) and the enrichment equipment all operate at high pressures, e.g., above 30 bars.